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Expanding School Choice through Open Enrolment: Lessons from British Columbia

British Columbia's "open enrolment" policy provides a rare opportunity to examine whether increased public school choice affects student achievement. Or does it concentrate minority students in enclave schools and promote cream-skimming? The findings are instructive for other provinces.

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The Study In Brief

Is expanding the scope for parents to choose among competing schools an effective policy lever for improving the quality of education? What lessons can we take from British Columbia's experience with greater school choice?

In 2002, British Columbia implemented a new policy that makes it easier for parents to opt out of their neighbourhood school. Along with the province's rich administrative and test score data, the introduction of this "open enrolment" policy provides a rare opportunity to estimate the extent to which increased public school choice affects student achievement, concentrates minority students in enclave schools and promotes cream-skimming.

Our results support several conclusions about British Columbia's experience with open enrolment. First, the fact that many more parents succeeded in enrolling their children in out-of-catchment schools demonstrates that the policy had a meaningful impact on the public school choice opportunities available to many families.

Second, the evidence suggests that open enrolment contributed to the development of important academic skills, but the magnitude of this impact depended on the geographic concentration of public schools. In the Lower Mainland, 10 to 15 percent of neighbourhoods are dense enough to have generated fairly substantial improvements in academic achievement. The gains in these neighbourhoods were equivalent to reducing class size by between two and three students; compared to class-size reductions, open enrolment is likely to be a fairly cost effective strategy for improving student achievement as measured by test scores. In the remaining neighbourhoods, where school density is lower, the impact of open enrolment on test scores was quite small.

Finally, open enrolment did little to either segregate or integrate Lower Mainland students according to their cultural and ethnic backgrounds. There is also little evidence that popular schools engaged in cream-skimming high-achieving students.

These generally positive results might encourage policymakers in other jurisdictions to give fresh thought to introducing greater school choice into their public education systems.

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Expanding the scope for parents to choose among competing schools, many economists argue, can be an effective policy lever for improving the quality of education.

Greater school choice would allow students to enrol in schools that better suit their particular needs, and motivate school leaders to work harder at delivering high-quality programs to avoid losing students to their competitors. Critics question, however, whether increased school choice actually delivers these promised benefits. Furthermore, they point out, it might make some students worse off. If greater school choice were to increase the concentration of immigrant children in "enclave" schools, for example, it might undermine their academic progress. If popular schools were to "cream-skim" the best students, those left behind would no longer benefit from any positive spillovers that good peers provide.

This *Commentary* summarizes the results of new research that investigates these key issues in the debate over school choice policies. In 2002, British Columbia implemented a new policy that makes it easier for parents to opt out of their neighbourhood school. Along with the province's rich administrative and test score data, the introduction of this "open enrolment" policy provides a rare opportunity to estimate the extent to which increased public school choice affects student achievement, concentrates minority students in enclave schools and promotes cream-skimming.

The results of this research support several conclusions. First, the data show that a substantial proportion of parents in the area of study (British Columbia's Lower Mainland region) have taken advantage of the new school choice opportunities the open enrolment policy has afforded. Second, the reading and numeracy scores of the average grade 4 student have improved under open enrolment. For students who live in densely populated neighbourhoods where they are able to opt out to alternative public schools without having to travel long distances, open enrolment has led to appreciable improvements in academic achievement. However, only 10 to 15 percent of Lower Mainland students live in neighbourhoods that are sufficiently dense that expanded choice is of real academic consequence. For the majority of students, open enrolment has led only to small achievement gains. Third, open enrolment has done little to either segregate or integrate students according to their cultural and ethnic backgrounds or their academic achievement.

The empirical research described in this *Commentary* is based on administrative and test score data extracted from the British Columbia Ministry of Education's student records by Maria Trache at Edudata Canada. Klaus Edenhoffer created the digital maps used to link student postal codes to school catchment areas using information provided by school district personnel. The programs used to create the school choice and information variables used in the analysis were adapted from code written by Mohsen Javdani. Funding for this research was provided by Metropolis British Columbia, Simon Fraser University's Community Trust Endowment Fund and the Social Sciences and Humanities Research Council of Canada. Census Disclaimer: This paper is released to inform interested parties of research and to encourage discussion. The views expressed are those of the authors and not necessarily those of the U.S. Census Bureau.

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These results suggest that open enrolment can contribute to improving the academic quality of public education without further segregating students. That said, open enrolment is not a silver bullet. For many students, distance to alternative schools precludes meaningful choice, and even where choice improves achievement, the effect is small compared to the magnitude of test score gaps between various groups of students (for example, male versus female, Aboriginal versus non-Aboriginal). Along with school choice and information policies that help to ensure the most effective use of resources, governments will have to look to a broader set of strategies if they want to make substantial strides toward closing the gaps between these groups.

Open Enrolment in British Columbia

The cornerstone of school choice in British Columbia's public education system has always been the neighbourhood school. By choosing to live in a particular neighbourhood, families are essentially guaranteed access to their local "catchment" school. The open enrolment policy introduced in 2002 weakened the authority of school principals in two key ways that made it easier for parents to opt out of their guaranteed school.

First, parents no longer need permission from their neighbourhood school's principal to enrol a child in a public school that serves a different catchment area. Under open enrolment, parents are free to enrol their children in any catchment school that will accept them. By taking away the authority to veto out-of-catchment enrolment applications, the new rule substantially undermined the monopoly power of the neighbourhood school.

Second, principals with excess capacity in their schools can no longer choose to leave spaces unfilled; this means that no out-of-catchment student can be turned away when there is enough space for all those who apply. When space is scarce, principals must give top priority to within-catchment children, followed by out-of-catchment children who live in the same school district and, in some districts, to children with siblings in the same school.

Parents' Response to Open Enrolment

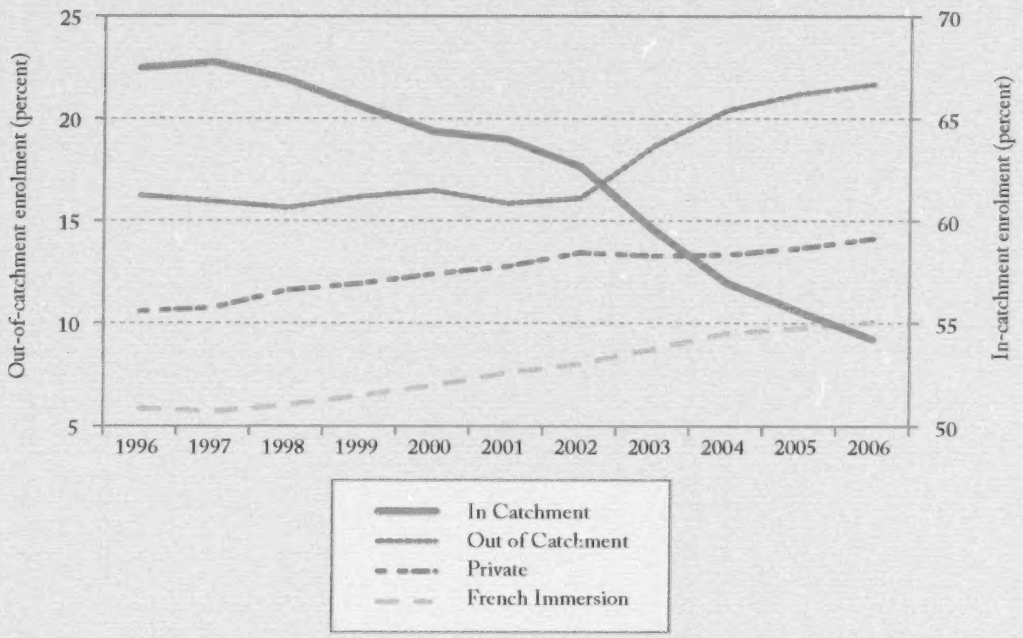
Many parents have embraced the school choice opportunities the new rules created. The share of students enrolled out of catchment (measured on the left-hand scale of Figure 1) started to increase in the first year after the new policy came into effect. By the 2006/07 school year, an additional 5.8 percent of the children living in British Columbia's 14 Lower Mainland public school districts were attending out-of-catchment public schools. This response to open enrolment has reinforced the decline in catchment school enrolment that was already underway as a result of growth of enrolment in private schools and French Immersion programs (measured on the left-hand scale). Together, these increases led to a dramatic decline of more over 13 percentage points in the share of Kindergarten students attending their neighbourhood (in-catchment) school between the 1996/97 and 2006/07 school years (measured on the right-hand scale).

The Effect of Open Enrolment on Student Achievement

That many parents have taken advantage of their new school choice opportunities under open enrolment in itself would convince some observers of the policy's value. But proponents of school choice make stronger claims: that open enrolment lets students enrol in better schools or in schools that better meet their needs; or that it leads principals to refocus their efforts to avoid losing students to their competitors. Both responses would contribute to students' academic success. Does the evidence support these claims?

We address this question using a strategy based on the insight that the impact of open enrolment

Figure 1: Enrolment of Kindergarten Children by Type of School, British Columbia, School Years 1996/97–2006/07



Source: Authors' calculations from British Columbia, Ministry of Education data.

ought to vary across neighbourhoods in predictable ways. As an extreme example, open enrolment is meaningless in a small community that has only one public school; we therefore would expect it to have no effect on the quality of education in that community. In contrast, in a dense urban area, the expansion of choice to include a large number of nearby schools might transform a set of neighbourhood schools into a more integrated and effective network (Friesen, Harris, and Woodcock 2013).

This reasoning suggests that we can measure the effect of open enrolment on academic achievement by comparing changes in outcomes (before and after the introduction of open enrolment in 2002) in areas where parents gained access to a larger number of nearby public schools to changes in outcomes in areas where this number was smaller. We applied this approach to estimating the effect of open enrolment on the Foundation Skills Assessment scores of grade 4 students in British Columbia's Lower Mainland.

Specifically, we estimated the relationship between the change in average test scores in a neighbourhood following the introduction of open enrolment and the number of public schools that are located within a reasonable travel distance to that neighbourhood (defined such that 75 percent of students in our sample travel no more than this distance to attend a regular public school). We

controlled for a wide variety of factors that might contribute to school choice decisions, including the student's own characteristics (gender, ethnicity and home language) as well as the characteristics of other students in their neighbourhood, mean neighbourhood family income and the number of nearby French Immersion and private schools.

We find strong statistical evidence that average reading and numeracy scores improved under open enrolment. We further find that this improvement is not an artifact created by a decline in test participation among weak students. The share of students writing the tests in fact increased in schools that faced more competition.

The Size of the Effect on Student Achievement

In an average neighbourhood, where families gained access to 3.6 nearby catchment schools, the effect of open enrolment for a student at the 50th percentile of the overall test score distribution (that is, for a student who scores higher than 50 percent of all students) is to increase the student's percentile ranking of reading scores by 1.2 points (that is, the student scores higher than 51.2 percent of all students) and the percentile ranking of numeracy scores by 1.0 point (Figure 2). In the top 10 percent of neighbourhoods in terms of density, where families gained access to 8.5 nearby catchment schools, the effect of open enrolment is to increase the student's reading score by 3.0 percentile points and her numeracy score by 2.4 percentile points.

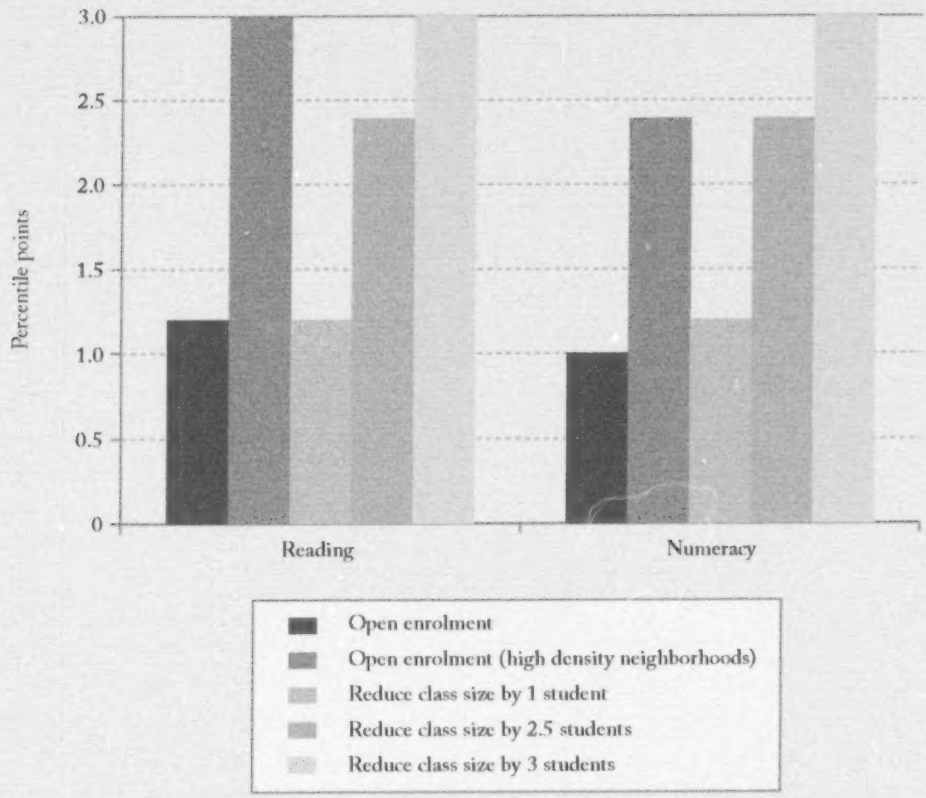
To put these effects in some context, we compared them to the estimated effect of reducing class size. A substantial and highly credible body of research shows that reducing class size increases average test scores, and that this effect appears to be approximately linear. Using Schanzenbach's (2014) estimates (reducing class size by one student increases achievement scores by about .025 standard deviations), we calculated that the magnitude of the effect of open enrolment on the test scores of students in the average neighbourhood was equivalent to the effect of reducing class size by about one student. In high-density neighbourhoods, the effect of open enrolment on reading scores was equivalent to reducing class size by about three students; in numeracy, it was equivalent to reducing class size by about two-and-a-half students.

Did Students Get Access to Better Schools or Did Schools Get Better?

Can we say anything about the potential underlying mechanisms that drove these improvements in test scores? This distinction is important: if open enrolment works by increasing competition between schools, all students attending those schools will enjoy the benefits without having to change their own school choice decisions. In this sense, open enrolment can create a "rising tide that lifts all boats." If open enrolment works primarily by letting some students enrol in more effective schools, the benefits will be limited to those students, and might even leave those who remain in their catchment school worse off if the quality of their peers declines.

We find it implausible that the estimated effects are entirely due to a shift in enrolment to relatively high-quality schools. As a hypothetical example, suppose that an additional 10 percent of students living in high-density neighbourhoods chose to enrol in out-of-catchment schools under open enrolment. In order to account for the entire estimated effect of open enrolment on student achievement (.77 standard deviations), these students' scores would have to improve such that a student scoring at the 50th percentile of the numeracy distribution would move up to the 78th percentile as a result of attending a different school (.077 standard deviations). Such a large gain would be astonishing, and is inconsistent with a substantial body of evidence that finds no improvements in test scores among students who opt out of local public schools in other environments (Betts et al. 2006; Clark 2010; Cullen, Jacob, and Levitt 2005, 2006; Deming et al. 2011; Hastings, Kane, and Staiger

Figure 2: Estimated Effect of Open Enrolment on Percentile Rank of Student Scoring at the 50th Percentile of the Reading and Numeracy Test Score Distributions, British Columbia



Note: Estimated effects are statistically significant at the 99% confidence level.
Source: Authors' calculations from British Columbia, Ministry of Education data.

2006, 2009; Hastings, Neilson, and Zimmerman 2012; Jackson 2010; Park et al. 2009).

It is reasonable to conclude, therefore, that at least some of the estimated achievement gains came about as a result of increased competition among public schools. This interpretation is also consistent with a growing body of evidence that other sources of competition have positive effects on student achievement in public schools, including choice between secular and Catholic school boards (Card, Dooley, and Payne 2010), threats of voucher sanctions under accountability frameworks (Chiang 2009; Rockoff and Turner 2010; Rouse et al. 2007), and private school tax credits for low-income students (Figlio and Hart 2010).

The Role of Local School Quality

In addition to varying with the proximity of school choice alternatives, we might also expect the impact of open enrolment to depend on the academic strength of the guaranteed catchment school. For families whose catchment school is relatively weak, for example, open enrolment might provide a low-cost ticket to a better learning environment. For families whose catchment school excels academically, nearby catchment schools might not offer opportunities for academic improvement.

For students whose catchment school scored lowest among nearby public schools, the effects are similar to those in the full sample (Figure 3). However, for students whose catchment school scored highest among nearby public schools, average test scores in numeracy actually declined. Why? We speculate that parents might have made school choices for non-academic reasons or that they might have been misinformed about school characteristics.

Open Enrolment and School-Level Segregation

The extent to which school systems are racially and ethnically segregated is a prevailing concern among education policymakers in many jurisdictions, particularly in the United States. The contribution of school choice policies to segregation often plays an important role in policy discussions and implementation – for example, some open enrolment policies specifically prohibit out-of-catchment enrolment when it will further exacerbate school-level segregation. Should this issue be of concern in the context of British Columbia's diverse population? Did the increase in school choice opportunities under open enrolment contribute to segregation of students from different backgrounds, or did it serve as a mechanism for greater school integration?

Measuring Segregation

To address these questions (for details, see Friesen, Harris, and Woodcock 2014), we began by assessing the degree to which Lower Mainland schools are segregated. British Columbia's school enrolment form collects information from parents about the language spoken in the child's home and allows them to self-identify as Aboriginal. Among families in our data, the largest minority home language group consists of those who speak a Chinese language (12 percent), followed by Punjabi (7 percent). Another 15 percent of students speak one of over 100 other non-English languages. About 6 percent of students identify as Aboriginal.

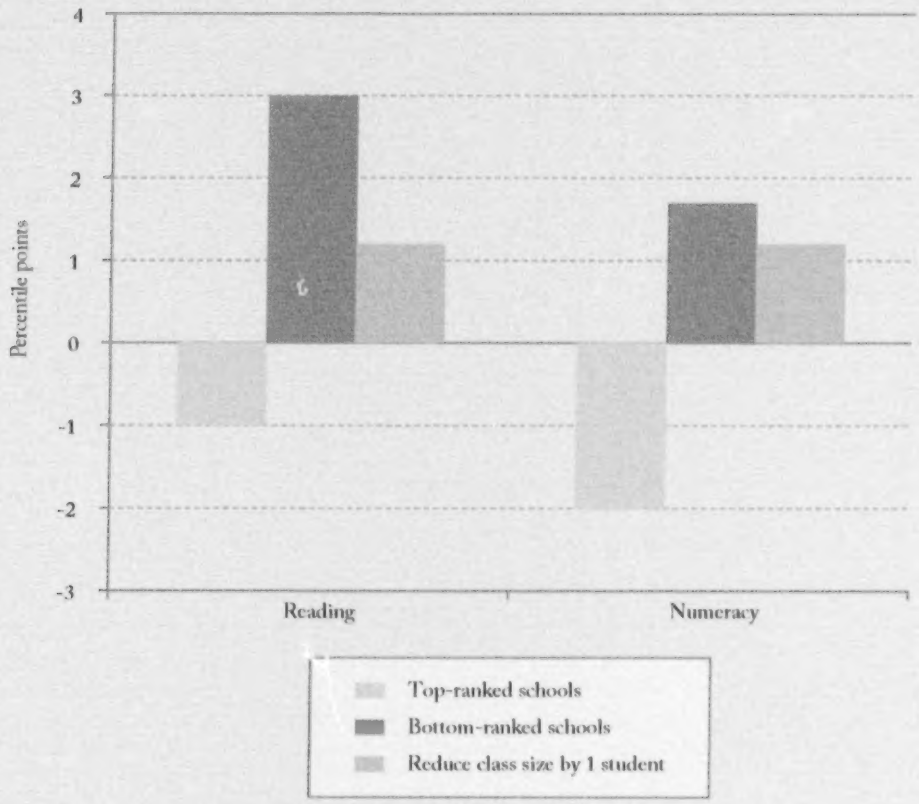
We measured the extent to which these groups are segregated across schools using a standard "dissimilarity index." This index takes on values between zero and 1, where zero indicates that children from these groups are distributed randomly across Lower Mainland schools and 1 indicates that schools are as segregated as possible.

Segregation in Lower Mainland Neighbourhoods and Schools

The degree of overall segregation in Lower Mainland schools (Figure 4) might be viewed as less than ideal for a number of reasons. For example, immigrant children might take longer to integrate into their new environment when they find themselves in enclave schools, and students from disadvantaged minority groups might face even greater challenges when the majority of their classmates face similar disadvantages. If so, the effect of school choice policies on school-level segregation is a legitimate concern.

The segments within each bar in Figure 4 represent the components of overall school-level segregation resulting from different forms of choice. The largest segment indicates the effect of residential choice; it tells us how much school-level

Figure 3: Estimated Effect of Open Enrolment on Percentile Rank of Student Scoring at the 50th Percentile of the Reading and Numeracy Test Score Distributions, Top- and Bottom-ranked Schools, Average-density Neighbourhoods, British Columbia

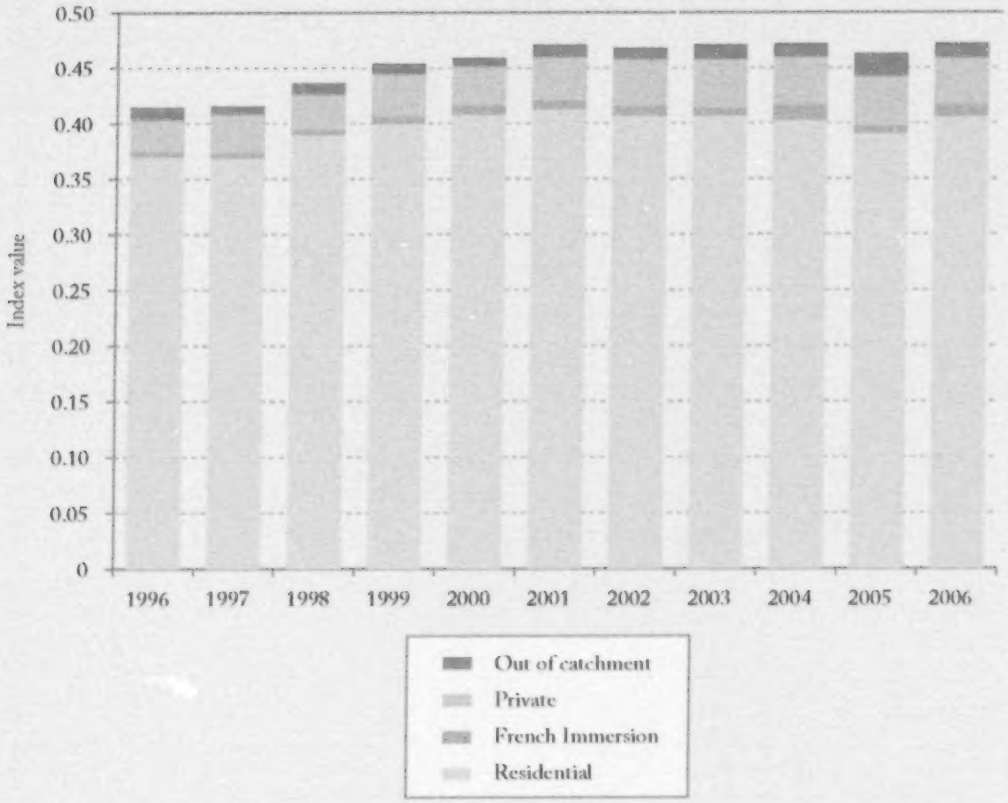


Source: Authors' calculations from British Columbia, Ministry of Education data.

segregation there would be if all students attended their neighbourhood catchment school. As in most areas with a diverse population, families from different language or cultural groups in the Lower Mainland tend to sort themselves into particular neighbourhoods or enclaves. Enclave communities produce enclave schools, as most students enrol in schools that are relatively close to their home. Residential sorting across neighbourhoods is responsible for roughly 85 percent of the overall school-level segregation we observe.

The remaining 15 percent of school-level segregation is the product of parents' decisions to enrol their children in an alternative option instead of in their neighbourhood school. The remaining segments of the bars in Figure 4 indicate the respective contributions to segregation of enrolment in out-of-catchment public schools,

Figure 4: Dissimilarity Index for Kindergarten Children, by Type and Neighbourhood of School, British Columbia, School Years 1996/97–2006/07



Source: Authors' calculations from British Columbia, Ministry of Education data.

French Immersion programs and private schools. Private school enrolment contributes substantially more to school-level segregation than do the two public-school choice options combined. Both out-of-catchment enrolment and French Immersion programs contribute only marginally to school-level segregation.

Finally, and most important for our analysis, a series of statistical tests provided no evidence that the increase in out-of-catchment enrolment following the introduction of open enrolment in 2002 coincided with a significant change in the extent of segregation across schools.

Open Enrolment and the "Cream-Skimming" of High-Achieving Students

Did the elimination of the catchment school principal's local veto over out-of-catchment enrolment decisions allow popular schools to "cream-skim" the best students from neighbouring schools? If so, did the average quality of some students' peers improve and others decline, even among students whose own school choice decisions were unaffected? Did open enrolment contribute to the concentration of high- and low-achieving students in different sets of schools, or did it allow for greater mixing of students with different achievement levels?

Measuring the Extent of Cream-Skimming

To investigate cream-skimming, we computed a measure of the extent to which reading and numeracy scores vary across students. We then decomposed this measure into "within-school" and "between-school" (also termed across-school) components. The within-school variance measures the extent to which test scores vary on average among students who attend the same school. The between-school variance measures the extent to which the average test score varies across different schools. If high-achieving students tend to attend school with other high-achieving students, and low-achieving students with other low-achieving students, the within-school variance of test scores will be small and the across-school variance will be large. If instead students sort randomly across schools, the within-school variance will be larger and the across-school variance smaller than in the case where students sort by ability.

We find that the across-school share of the variation in student achievement increased steadily between 1999 and 2006: from 12.2 percent to 15.4 percent in reading, and from 15.9 percent to 21.5 percent in numeracy (Figure 5). A series of statistical tests provided no evidence to suggest that open enrolment contributed to the growth in the between-school variance of numeracy scores. We did, however, find weak evidence that open enrolment coincided with an increase in the between-school variance of reading scores of about 2.3 percentage points.

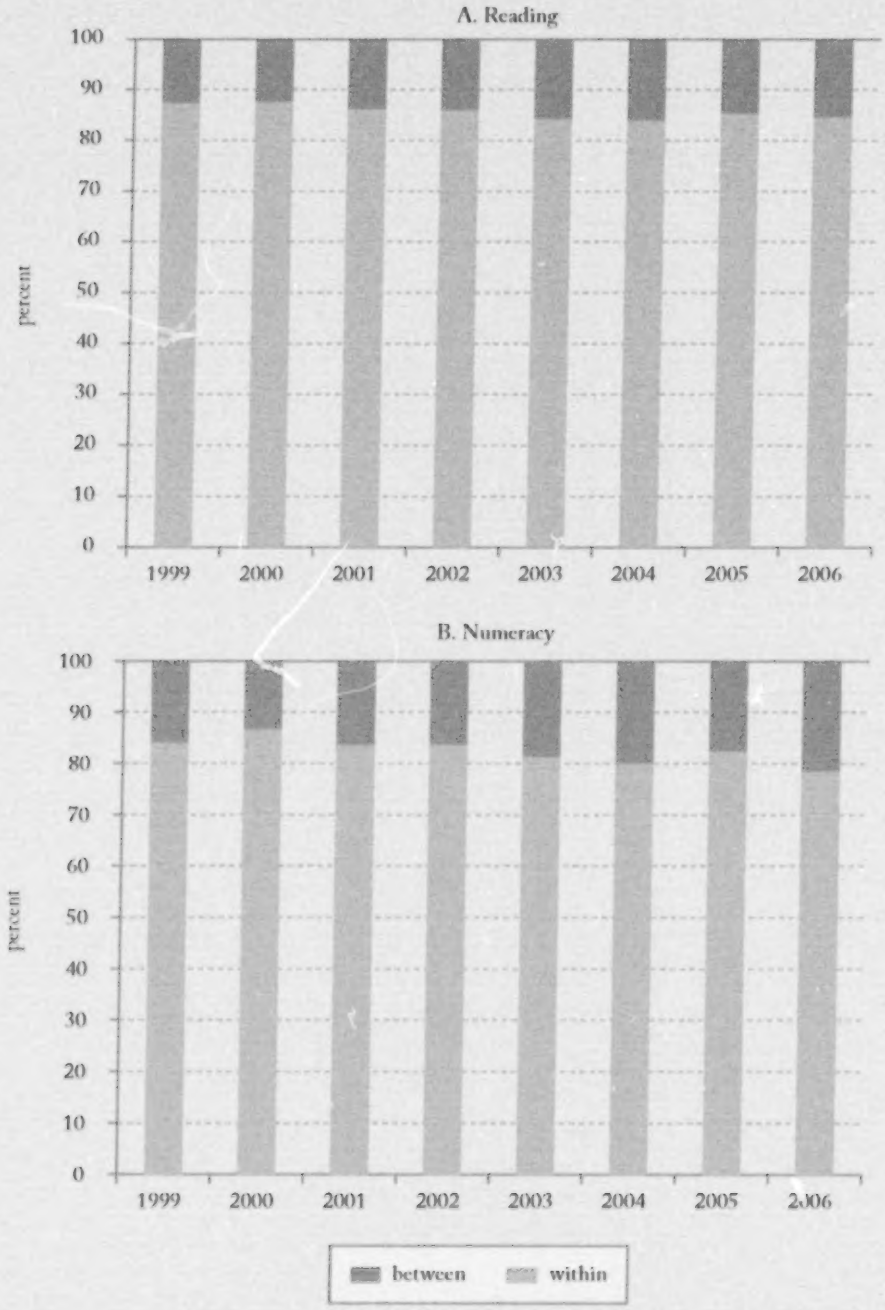
Lessons from British Columbia's Experience with Open Enrolment

Our results support several conclusions about British Columbia's experience with open enrolment. First, the fact that many more parents succeeded in enrolling their children in out-of-catchment schools demonstrates that the policy had a meaningful impact on the public-school choice opportunities available to many families.

Second, the evidence suggests that open enrolment contributed to the development of important academic skills, but the magnitude of this impact depended on the geographic concentration of public schools. In the Lower Mainland, 10 to 15 percent of neighbourhoods are dense enough to have generated fairly substantial improvements in academic achievement. The gains in these neighbourhoods were equivalent to reducing class size by between two and three students; compared to class-size reductions, open enrolment is likely to be a fairly cost effective strategy for improving student achievement as measured by test scores. In the remaining neighbourhoods, where school density is lower, the impact of open enrolment on test scores was quite small.

Finally, open enrolment did little to either segregate or integrate Lower Mainland students according to their cultural and ethnic backgrounds. There is also little evidence that popular schools engaged in cream-skimming high-achieving students.

Figure 5: Share of Overall Grade 4 Reading and Numeracy Test Score Variance Accounted for by Within- and Between-school Variation, British Columbia, School Years 1999/2000–2006/07



Sources: Authors' calculations from B.C. Ministry of Education data.

Lessons for other Jurisdictions

These generally positive results might encourage policymakers in other jurisdictions to give fresh thought to introducing greater school choice into their public education systems.

When extrapolating from British Columbia's experience to other institutional contexts, however, several factors should be borne in mind.

First, the potential impact of open enrolment depends fundamentally on the extent to which parents want to enrol their children in out-of-catchment public schools. Geographic proximity plays a strong role in school choice decisions — parents are far more likely to opt out of their neighbourhood school when alternatives are nearby. Open enrolment therefore holds the most promise in the context of large, densely populated cities. Jurisdictions that allow public schools more scope to innovate and specialize might realize greater benefits from a policy of open enrolment if more parents exercise school choice when schools offer a greater diversity of programs.

Second, the potential impact of open enrolment further depends on the ability of some parents to gain access to their preferred schools. In British Columbia, many schools had spaces available after in-catchment students enrolled. This excess capacity in the catchment school system was the result of both a declining school-age population and growing enrolment in private schools and French Immersion programs. Open enrolment likely would be less effective in circumstances of greater enrolment pressure from in-catchment students.

Third, unlike many US jurisdictions, principals and teachers in British Columbia are only weakly accountable for the success of their students. Their pay is not tied to student performance, and low-scoring schools do not face voucher threats or other sanctions. Instead, principals in British Columbia might be motivated to increase their effort or focus on academic results under open enrolment primarily out of a sense of professionalism. Different accountability regimes might produce different results. Higher stakes might intensify pressure to improve academic quality under open enrolment. However, a substantial body of research has identified undesirable and unintended consequences of high-stakes accountability environments, including teaching to the test and falsification of results. These effects could also be amplified under open enrolment.

Fourth, in British Columbia, school-level Foundation Skills Assessment test scores are published online and widely discussed, and research has shown that school choice decisions are influenced by these results (Friesen et al. 2012). The effect of open enrolment might be weaker, however, in jurisdictions where parents' school choice decisions are less well informed about average achievement levels in different schools.

Finally, when assessing the potential benefits of open enrolment, jurisdictions should keep in mind the potential for unintended consequences. In most school finance systems, money tends to follow students. Schools that experience declining enrolment under open enrolment therefore are likely to lose resources. At some point they might even be threatened with closure, disrupting school communities and forcing some students to travel farther to attend school. Moreover, neighbourhood schools can play an important role in building and sustaining relationships within local communities. When more children attend school outside the neighbourhood, community ties might become weaker. Although these kinds of unintended consequences are more difficult to measure, some policymakers might consider them important.

Conclusion

Researchers working with data from a wide range of jurisdictions are slowly building a solid body of empirical support for the long-held view that school choice policies can improve the academic quality of public education systems. These policies, however,

are not a silver bullet. Compared to the magnitude of test score gaps between various groups of students (male versus female, Aboriginal versus non-Aboriginal), the impact of increased choice is small in most neighbourhoods. Along with school choice and information policies that help to ensure the most effective use of resources, jurisdictions that want to improve student outcomes will have to look to other strategies, such as improvements in teacher training and better support for students with special needs, if they want to make broader improvements in outcomes.

REFERENCES

Betts, Julian R., Lorien A. Rice, Andrew C. Zau, Y. Emily Tang, and Cory R. Koedel. 2006. *Does School Choice Work? Effects on Student Integration and Achievement.* San Francisco: Public Policy Institute of California.

Card, David, Martin D. Dooley, and A. Abigail Payne. 2010. "School Competition and Efficiency with Publicly Funded Catholic Schools." *American Economic Journal: Applied Economics* 2 (4): 150–76.

Chiang, Hanley. 2009. "How Accountability Pressure on Failing Schools Affects Student Achievement." *Journal of Public Economics* 93 (9-10): 1045–57.

Clark, Damon. 2010. "Selective Schools and Academic Achievement." *B.E. Journal of Economic Analysis and Policy: Advances* 10 (1): art. 9.

Cullen, Julie Berry, Brian A. Jacob, and Steven D. Levitt. 2005. "The Impact of School Choice on Student Outcomes: An Analysis of the Chicago Public Schools." *Journal of Public Economics* 89 (5-6): 729–60.

———. 2006. "The Effect of School Choice on Participants: Evidence from Randomized Lotteries." *Econometrica* 74(5): 1191–230.

Deming, David J., Justine S. Hastings, Thomas J. Kane, and Douglas O. Staiger. 2011. "School Choice and College Attendance: Evidence from Randomized Lotteries." NBER Working Paper 17438. Cambridge, MA: National Bureau of Economic Research.

Figlio, David N., and Cassandra M.D. Hart. 2010. "Competitive Effects of Means-tested School Vouchers. " NBER Working Paper 16056. Cambridge, MA: National Bureau of Economic Research.

Friesen, Jane, Mohsen Javdani, Justin Smith, and Simon Woodcock. 2012. "How do School 'Report Cards' affect School Choice Decisions?" *Canadian Journal of Economics* 45 (2): 784 – 807.

Friesen, Jane, Benjamin C. Harris and Simon Woodcock. 2013. "Open Enrolment and Student Achievement." Working Paper No. 126. Vancouver BC: Canadian Labour Market and Skills Researcher Network.

———. 2014. "School Choice and Sorting under Open Enrolment." Working paper. Burnaby, BC: Simon Fraser University, Centre for Education Research and Policy.

Hastings, Justine S., Thomas J. Kane, and Douglas O. Staiger. 2006. "Gender and Performance: Evidence from School Assignment by Randomized Lottery." *American Economic Review Papers and Proceedings* 96 (2): 232–6.

———. 2009. "Heterogeneous Preferences and the Efficacy of Public School Choice." NBER Working Papers 12145 and 11805 combined. Cambridge, MA: National Bureau of Economic Research.

Hastings, Justine S., Christopher Neilson, and Seth Zimmerman. 2012. "The Effect of School Choice on Intrinsic Motivation and Academic Outcomes." NBER Working Paper 18324. Cambridge, MA: National Bureau of Economic Research.

Jackson, C.K. 2010. "Do Students Benefit from Attending Better Schools? Evidence from Rule Based Student Assignments in Trinidad and Tobago." *Economic Journal* 120 (549): 1399–429.

Park, A., X. Shi, C.-T. Hsieh, and X. An. 2009. "Does School Quality Matter? Evidence from a Natural Experiment in Rural China." Paper prepared for the Fourth Annual Conference on Development and Institutions, London, June 4–5.

Rockoff, Jonah, and Lesley J. Turner. 2010. "Short-run Impacts of Accountability on School Quality." *American Economic Review: Economic Policy* 2 (4): 119–47.

Rouse, C. E., J. Hannaway, D. Goldhaber, and D.N. Figlio. 2013. "Feeling the Florida Heat? How Low-performing Schools Respond to Voucher and Accountability Pressure." *American Economic Journal: Economic Policy* 5 (2): 251–81.

Schanzenbach, Diane Whitmore. 2014. "Does Class Size Matter?" Boulder: University of Colorado, National Education Policy Center.

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